IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application of
Appellants : Davlin et al.
Serial No. : 09/651,498
Filed : August 30, 2000
Title : TEMPERATURE CONTROL ELEMENTS, SPINDLE ASSEMBLY, AND WAFER PROCESSING ASSEMBLY INCORPORATING SAME
Docket : MIO 0071 PA/40509.127
Examiner : Ram N. Kackar
Art Unit : 1763
Conf. No. : 1401

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Sir:

REPLY BRIEF

This reply brief is being filed in response to the Examiner's Answer mailed September 8, 2004, wherein new points of arguments were raised in responding to the Appeal Brief filed on August 11, 2004. This Reply Brief is directed to addressing these points. The Examiner is requested either to acknowledge receipt and entry of this reply brief or withdraw the final rejection and reopen prosecution to respond thereto.

BRIEF SUMMARY OF THE INVENTION ON APPEAL

For the Board's convenience, the claimed invention on appeal relates to a rotary spindle assembly for wafer processing. Specialized temperature control features, including a heat regulating element and a heat regulating flange, are arranged as part of the assembly to improve processing uniformity and accuracy of the wafer. The heat regulating element is made up of a fluid-conduit that defines a substantially cylindrical heat regulation void about at least a portion

of a rotary spindle such that exhaust gases (such as air) may flow through the void between the spindle and conduit. The heat regulating element is of an open framework construction, where the upper and lower ends of the heat regulating element are open to provide a substantially unrestricted exhaust gas flow path, thereby minimizing degradation of the gas flow profile. The configuration of the assembly is such that a thermal control fluid (for example, water) passes through the conduit and exchanges heat with the exhaust gas that is being circulated through the open framework of the heat regulation void, thereby promoting stable temperatures of the gas that subsequently comes into contact with the wafer.

NEW POINTS OF ARGUMENT RAISED BY THE EXAMINER'S ANSWER

There are basically two points of argument in the Examiner's Answer that necessitate an additional response by the Appellant. These are:

A. That the Appellants are incorrect when they assert that the primary reference (US Patent 5,762,709) to Sugimoto et al (hereinafter the '709 patent) does not define an open framework construction that is incapable of providing adequate exhaust gas flow; and

B. That the combination of the '709 patent and the secondary reference (US Patent 5,578,127) to Kimura (hereinafter the '127 patent) teaches that the fluid conduit be placed around the cylindrical heat regulation void in a manner similar to that of the claimed device to disclose a heat exchange arrangement between the flowing exhaust gas and the thermal control fluid.

APPELLANTS' RESPONSE TO NEW POINTS OF ARGUMENT

A. The Appellants have never characterized the flow path of the '709 patent as providing inadequate air flow, merely that the quality of that air flow is compromised by the closed framework configuration of the '709 patent.

Independent claims 36 and 44 recite that "an exchange of heat occurs" between the exhaust gas and the thermal control fluid that passes through the fluid conduit. Furthermore, the

fluid conduit makes up the heat regulating element that "defines an open framework arranged about [the] rotary spindle" in such a way as to define a substantially cylindrical heat regulation void. By this configuration, the exhaust gas is made to flow in the void formed between the spindle and the fluid conduit. The Appellants' use of the term "about", intended to signify that the open framework of the heat regulating element circles around the rotary spindle, is consistent with the accepted pedestrian use as defined in *Webster's Ninth New Collegiate Dictionary* (1988 ed.), where "about" is "in a circle around", and "on all sides" of another object. Similarly, the Appellants' use of the term "open framework" is meant to convey the substantially unobstructed exhaust gas flow path of the heat regulation void within the heat regulating element. The nature of this open framework is made manifest by reference to original specification page 11, lines 22 through 27 in conjunction with FIGS. 2 and 4, where heat regulating element **50** having upper and lower ends that coincide with the ends depicted in FIG. 4 includes fluid conduit **58** that defines a heat regulation void **55** between it and the spindle **24**.

The Appellants' position has been all along that the preservation of gaseous flow characteristics through an open framework enhances the performance of the assembly. The juxtaposition of the exhaust gas in the heat regulation void to the thermal control fluid in the fluid conduit facilitates heat exchange between the gas and the fluid in the region about the spindle. Moreover, it defines the open framework where (as stated in the original specification at page 3) "the dimensions of the circumferential gas flow path between the rotary spindle and the fluid conduit are selected to avoid substantial degradation of the exhaust gas flow profile".

The configuration of the claimed device avoids the problems of the closed exhaust gas flow profile configurations depicted in the '709 and '127 patents, where the airflow mechanism of the '709 patent used in a heat regulating capacity teaches a closed configuration, as evidenced by the air supply conduit **30** and damper **40** shown in FIG. 2 in conjunction with the small nature of the conduit openings discussed at column 5, lines 39 through 43. It is clear that an inherent feature of the closed, damper-based approach taken in the '709 patent is that it significantly alters the flow of exhaust gas, and as such represents a complete dissimilarity in the way thermal management issues are addressed. By stressing this difference, the Appellants are making no

judgments as to the adequacy of the air flow of the '709 patent, but rather to its efficacy; this distinction is important in the following discussion to refute the Examiner's assertion that the particular configuration (including placement of the various components) of the claimed heat regulating element and the heat regulating void formed thereby is obvious.

B. A proper prima facie case for obviousness is not made out when the references used to reject the claimed device do not teach or suggest all of the claim recitations.

"To establish a *prima facie* case of obviousness, three basic criteria must be met." MPEP 2142. Among these is the bedrock principle that all claim limitations should be taught or suggested. MPEP 2143.03. Regarding the present rejection, while the combination of the '709 and '127 patents does teach a rotary spindle assembly with the ability to circulate gas around a rotary spindle, it is silent as to using a heat exchange arrangement between a flowing exhaust gas and a heat regulating fluid disposed in conduit around that spindle.

The '709 patent does not discuss using an exhaust gas that passes through a heat regulation void that is mutually adjacent the spindle and the heat exchange fluid. In both the May 5, 2004 final rejection (at page 4) and the September 8, 2004 Examiner's Answer (at page 5), the Examiner candidly admits that the '709 patent does not teach that the temperature control of the exhaust gas is performed at the spindle. Thus, it cannot be gainsaid that the primary reference relied on by the Examiner does not teach the claimed features of claims 36 and 44.

This distinction is not remedied by the '127 patent, where its complete absence of any type of framework, whether open or closed, about a spindle such that a heat regulation void is defined between the spindle and element prevents its use as a secondary teaching. The Examiner's position that the fluid temperature control of the flange of the '127 patent teaches a heat exchange device similar to that of the claimed device is misplaced, as it seeks to mimic the open framework heat regulation void defined between the spindle and fluid conduit of the claimed device where in fact no such structure exists in the '127 patent. Moreover, the heat exchange relationship depicted in the '127 patent is between a heat exchange fluid embedded in a

flanged support structure and a wafer placed on a support surface that effects a conductive heat exchange relationship. In fact, the '127 patent limits the use of such fluid to the heat regulating flange, avoiding any discussion generally as to convective heat exchange and particularly to the applicability of a heat exchange relationship between the exhaust gas and a cooling fluid in the vicinity of the spindle. There is no evidence that the '127 patent teaches or suggests that a fluid conduit be placed about spindle **31a** (shown in FIG. 2) to effect a heat exchange relationship with exhaust gas flowing past the spindle. In fact, the only discussion in the '127 patent of conduit used to transport heat exchange fluid is made in conjunction with flange **31b** (described at column 5, lines 17 through 29) and plate **20** (described at column 4, lines 47 through 51), as well as the resist supply nozzle **30** (described at column 5, lines 30 through 41). Taken together or separately, the '709 and '127 patents present a completely different arrangement than the claimed device.

Any doubt about the Examiner's concession that the claimed device is not taught by the combined teaching of the '709 and '127 patents is removed when he notes at page 4 of the May 5, 2004 final rejection that the difference is merely manifested in "a rearrangement of parts". It appears that the Examiner is relying on the line of cases discussed in MPEP 2144.04 that includes *In re Japikse*, 86 USPQ 70 (CCPA 1950) and *In re Kuhle*, 188 USPQ 7 (CCPA 1975), both to assert that the claimed device's placement of the fluid conduit about the spindle is a mere rearrangement of parts that would be a matter of obvious design choice. The Appellants do not dispute the holding of that line of cases; what the Appellants do dispute is the applicability of those holdings to the facts of the present case, where the Examiner tries to excuse himself from the aforementioned requirements of MPEP 2143.03 by stating that any remaining differences are nothing more than obvious component placement. A proper reading of the holdings in the above cases leads to the inescapable conclusion that for a rearrangement of parts to be obvious, there must be no significance to the particular placement, as one of the courts noted that "there would be no invention in shifting the [component] to a different position since the operation of the device would not be modified." *In re Japikse*, 86 USPQ at 73. The Appellants state unequivocally (for example, at pages 3 and 11 of the original specification) that the use of the open framework and the attendant heat regulation void prohibits substantial degradation of the

wafer processing assembly gas flow profile. Thus, the significance placed by the Appellants on the particular location of the heat regulating element is precisely the scenario to which the holding in *Japikse* and *Kuhle* is NOT applicable.

CONCLUSION AND RELIEF REQUESTED

Thus, the '709 patent does not define an open framework construction capable of avoiding substantial degradation of the exhaust gas flow profile. In addition, the '127 patent, by not teaching a fluid conduit placed about a cylindrical heat regulation void in a manner similar to that of the claimed device to promote a heat exchange arrangement between the flowing exhaust gas and the thermal control fluid claimed open framework, does nothing to rectify the shortcoming of the '709 patent. For these reasons, the Appellants submit that the rejections are not well taken, and should be reversed in their entirety by this Board.

Respectfully submitted,

DINSMORE & SHOHL L.L.P.

By _____
John D. Reed
Registration No. 46,506

One Dayton Centre
One South Main Street, Suite 1300
Dayton, Ohio 45402-2023
(937) 449-6453
Facsimile: (937) 449-6405
E-mail: john.reed@dinslaw.com

JDR/das

Dinsmore&Shohl LLP
ATTORNEYS

FACSIMILE TRANSMITTAL

from **JOHN D. REED**
Direct: 937-449-6453 / Fax: 937-223-0724 / john.reed@dinslaw.com

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To: Ram N. Kackar
Art Unit 1763

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